Mental Health and Addiction Research

Short Communication

A brief update on videogame play and flow experience: From addiction to healthy gaming

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The latest technological advancements brought about a whole host of new possibilities and immersive experiences to gamers that were not possible a few years ago. Moreover, the Internet has simultaneously played a significant role in augmenting both the quality of players' immersive experiences and the social nature of videogames as most households in Western countries now have broadband Internet access and penetration rates across the globe is continuously on the rise [1]. Unsurprisingly, there has been a significant increase in recent years of social gamers, and the latest figures suggest that almost half of all gamers play social games [2]. Furthermore, the videogame industry has witnessed a rapid evolution and steady economic growth in recent years [2]. More specifically, a total of $23.5 billion dollars was spent by gamers in 2015, while the majority of households in the United States are now home to at least one person who plays video games on a regular basis [2].

Although for the most part videogame play is a healthy and beneficial activity associated with numerous psychological and social perks [3-6], there is growing evidence suggesting that a minority of gamers experience a wide range of adverse consequences due to excessive and dysregulated gaming that impairs daily functioning and overall psychological health [7-11]. Some of the negative consequences associated with addictive videogame play involve poor work [12] and academic performance [13], alterations of the stress response systems [14], decreased psychosocial wellbeing and greater incidence of depressive symptoms [15], reduced life satisfaction, increased levels of anxiety, greater motor and attentional impulsivity [16], attention deficit and hyperactive disorder, hostility [17], and sleep deprivation [18]. Specific physical and biological negative outcomes include abdominal obesity, cardio-metabolic deficits [19], rupture of the extensor pollicis longus tendon [20], and general bodily discomforts [21].

In general, videogame addiction tends to affect a small portion of gamers. Accordingly, robust epidemiological studies using nationally representative samples reported prevalence rates ranging from 1.2% to 8.5% according to a recent review [22]. Notwithstanding this, official medical bodies urged that videogame addiction be further investigated so that the clinical features of this phenomenon can be better understood and appropriate preventive and treatment measures can be developed. Moreover, Internet Gaming Disorder (IGD) was included in the Section 3 of the latest (fifth) edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) by the American Psychiatric Association (APA) [23] as a condition that warrants future study. Additionally, the World Health Organization (WHO) has recently included 'Gaming Disorder' (GD) in the beta draft of the eleventh revision *International Classification of Diseases* (ICD) (ICD-11) [24].

In terms of its definition, the APA [23] defines IGD throughout nine criteria relating to the following aspects of excessive and addictive gaming: (i) preoccupation with gaming; (ii) withdrawal symptoms when gaming is taken away; (iii) tolerance, expressed by the need to spend increasing amounts of time engaged with gaming; (iv) unsuccessful attempts to control gaming use; (v) continued excessive gaming use despite knowledge of negative psychosocial problems; (vi) loss of interests, previous hobbies, entertainment as result of, and with the exception of gaming use, (vii) use of videogames to escape or relieve a dysphoric mood, (viii) deception of family members, therapists, or others regarding the amount of gaming, and (ix) jeopardizing or losing a significant relationship, job, or educational or career opportunity because of gaming use [23]. Similarly, the WHO [24] has tentatively defined GD as being manifested by a persistent or recurrent gaming behavior characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation of gaming despite the occurrence of negative consequences. Common to both definitions is the notion that videogame addiction results in significant impairment in personal, family, social, educational, occupational or other important areas of functioning.

Given the current criticisms and debates surrounding the legitimacy of videogame addiction as a *bona fide* behavioral addiction [25-27], it is unlikely that official recognition will be achieved before (i) its defining features have been identified, (ii) reliability and validity of specific diagnostic criteria have been obtained cross-culturally, (iii) prevalence rates have been determined in representative epidemiological samples across the world, and (iv) etiology and associated biological features have been evaluated [28]. Regardless of existing debates, research has paid little attention to the role of flow experiences in videogame play, an area that still needs further investigation [29].

The concept of flow translates optimal experiences in activities (e.g., videogame play) that are intrinsically motivating to individuals, providing them with positive psychological states and increased wellbeing that result in augmented involvement and absorption in such

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Received: January 13, 2017; **Accepted:** January 30, 2017; **Published:** February 03, 2017

activities [30]. Flow experiences are defined by nine main criteria: (i) a perfect balance between the challenges of the activity and the individual skills; (ii) conflation between the action and individuals' consciousness expressed by spontaneity and automaticity in the activity; (iii) existence of clear goals in the activity; (iv) immediate and unequivocal feedback about the activity achievements and goals, as well as the individuals' progress towards them; (v) full concentration in the activity; (vi) perception of total and clear control of the activity or situation with no effort to exercise control; (vii) loss of self-consciousness, which is different from being unaware of what is happening in the individuals' mind or body; (viii) altered perception of time perception; (ix) an autotelic experience, the ultimate consequence of being in a flow state [31]. In fact, the concept of flow has been widely employed by the gaming industry as it is one of the most reliable predictors of acceptance and adoption of new videogames [32], and as flow experiences contribute to continuation of videogame play [33].

Although there is preliminary evidence suggesting that flow experiences can be a key factor accounting for videogame play in general [34], research in this area is still on its early infancy, with only a few empirical studies having being conducted. Consequently, the interplay between flow experiences, videogame addiction, and healthy gaming remains unclear as the existing evidence is scarce. Wu, Scott and Yan [35] hypothesized that flow experiences may contribute to videogame addiction. However, the study conducted by Wan and Chiou [36] found flow experiences to be negatively associated with addictive inclination towards videogames, which led the authors to assert that flow experiences may not be the key psychological mechanism underlying videogame addiction. Online game flow has also been found to be a mediating factor between game motivations and videogame addiction [37], and a relatively recent study on videogame addiction and flow found that a particular factor of the flow experience (i.e., heightened levels of a sense of time being altered during play) significantly predicted videogame addiction [29].

Irrespective of the aforementioned inconsistencies, it is clear that the literature in this area has focused almost exclusively on the role of flow experiences in videogame addiction and/or negative consequences emerging from gaming. Thus, it is still unclear how flow experiences may impact on healthy gaming and what are the potential positive psychological effects and benefits resulting from optimal experiences in the context of videogame play. It is timely to understand and unravel the potential positive implications of flow experiences associated in healthy gaming as this could pave the way to future research that can promote further understanding on how individuals can use videogames to their benefit by potentially mitigating negative outcomes resulting from videogame addiction.

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